HCM-3E4-50 Hydraulic Power Unit

User's Manual

E.H. Wachs
600 Knightsbridge Parkway
Lincolnshire, IL 60069
www.ehwachs.com

E.H. Wachs Company Part No. 14-MAN-28

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Chapter 1

HCM-3E4-50 Hydraulic Power Unit

The Wachs HCM-3E4-50 hydraulic power unit is an electric-powered unit providing 8 gpm flow at a maximum pressure of 1500 psi (30 l/min at 103 bar). It is available in either a standard or an explosion-proof configuration. The explosion-proof version uses a motor and power panel designed for safe operation in explosive environments.

The HCM-3E4-50 is designed to operate Type 1, Type 2, or Type 3 open-center tools.

FEATURES AND SPECIFICATIONS

CHECK ITEMS IN BOLD

- **15 HP** electric motor
- 440 V, 50 Hz power requirement.
- **Enclosed hydraulic system with self-contained reservoir and filtration.**
- **Sound-suppression lining.**
- **Enclosed, high-capacity cooling system with shaft-mounted air-to-oil cooler and suction fan; meets or exceeds HTMA specifications.**
- Hydraulic oil level sight gauge.
- HTMA quick disconnect couplers.
- Cart design with collapsible handles and large diameter tires.

Table 1 and the following figures describe the 3E3 electric power unit.

Table 1: HCM-3E4-50 Specifications

Hydraulic system	Open center
Frame type	2-wheel mobile unit
Electrical	415-440 V, 50 Hz, 3 phase
Fuse panel	30 A
Wiring	10 gauge (5 mm^2)
Motor	15 HP, 440 V, 3 phase
Oil cooler	Air to oil with independent fan
Filtration	10 micron return
Hydraulic oil capacity	7.0 gallons (25.6 liters)
Rated flow (no pressure)	8 gpm (30 l/min)
Rated flow @ 1500 psi (103 bar)	15 gpm (56 l/min)
Rated (relief) pressure	1500 psi (103 bar)
Dimensions (L x W x H)	38.5” x 26” x 40” (978 x 660 x 1016 mm)
Weight	500 lb (227 kg)

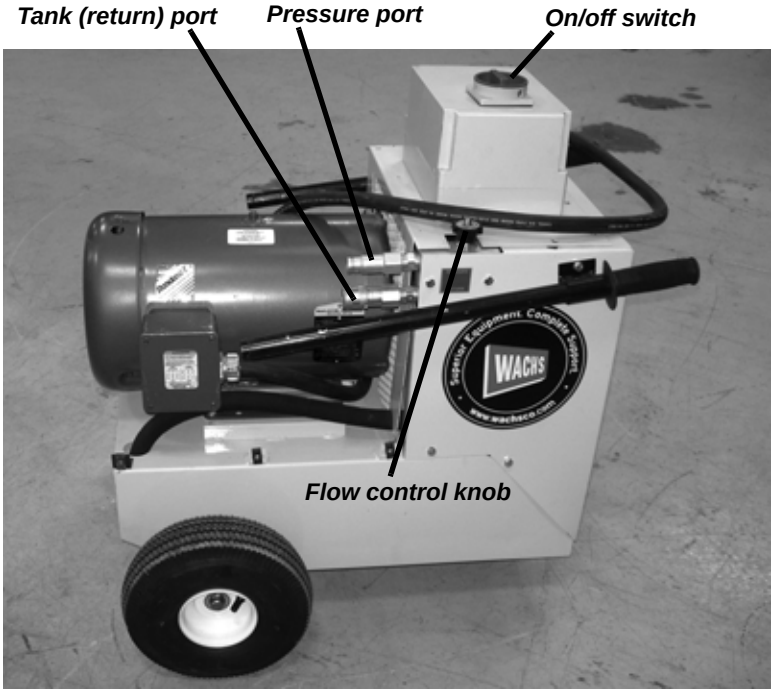


Figure 1-1. The photo shows the 3E4-50 electric power unit.

WIRING REFERENCE

Wachs hydraulic power units are prewired at the factory. This page describes wiring of the HCM-3E4-50 in case you need to perform service on the unit. Refer to the electrical specifications in Table 1.

Power Switch

The power switch is on the front of the electrical control box. Turn the switch clockwise to turn the unit on. Turn the switch counter-clockwise to turn the unit off.

Plug (Input) Wiring

The photo at the right shows the input power cable. The green wire is ground. The other wires (black, white, and red) are hot.

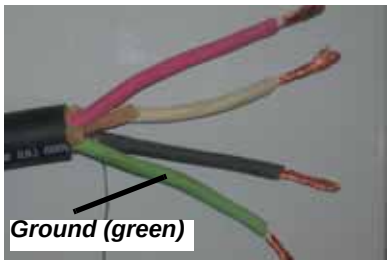
After connecting the cable to input power, "bump" the motor on and off to check the direction it is rotating. A label on the motor (shown at right) indicates the motor rotation direction. If the motor is rotating the wrong direction, flip any 2 of the "hot" power input wires to reverse the direction.

Switch and Fusebox Wiring

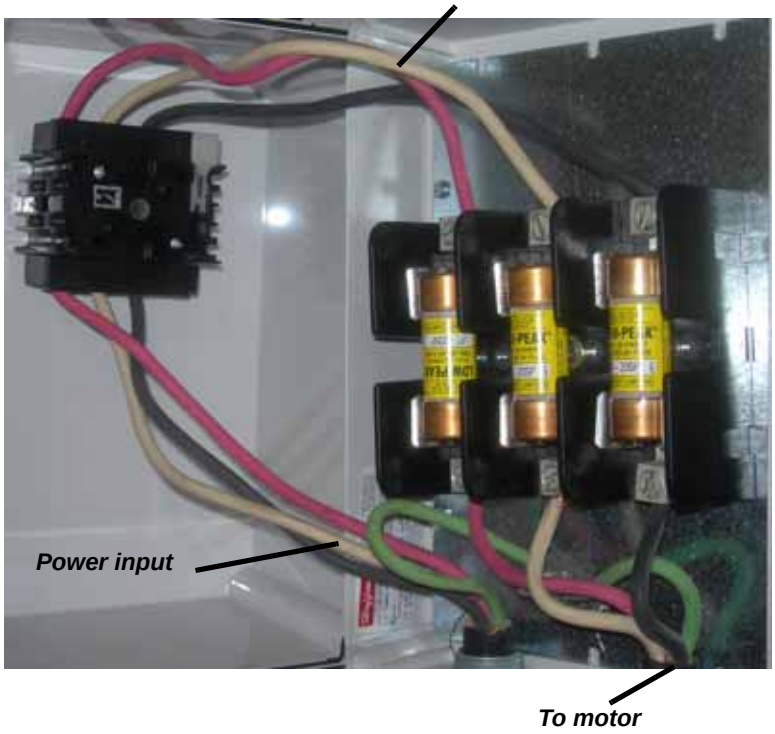
The photos below show the wiring of the switch and fusebox. Make sure fuses are 30 amps.

WARNING

All electrical work should be performed by a qualified electrician. Disconnect main electrical power to the unit before removing covers. Disconnect hydraulic circuit before performing service.



Motor should turn clockwise



Motor Wiring

The motor on the HCM-3E4-50 is prewired at the factory for high voltage (440 V) operation, as shown on the wiring connection label on the motor. No other service is required.

Voltage of units in the field cannot be changed with the supplied components. Contact factory service at E.H. Wachs if this is required.

Chapter 2
Safety

E.H. Wachs takes great pride in designing and manufacturing safe, high-quality products. We make user safety a top priority in the design of all our products.

Read this chapter carefully before operating the hydraulic power unit. It contains important safety instructions and recommendations.

In This Chapter

OPERATOR SAFETY

OPERATOR SAFETY

Follow these guidelines for safe operation of the equipment.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin.
- **INSPECT MACHINE AND ACCESSORIES.** Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- **ALWAYS READ PLACARDS AND LABELS.** Make sure all placards, labels, and stickers are clearly legible and in good condition. You can purchase replacement labels from E.H. Wachs Company.
- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts.

Look for this symbol throughout the manual. It indicates a personal injury hazard.

Always turn machine off before doing any adjustments or service.

- **SECURE LOOSE CLOTHING AND JEWELRY.** Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- **KEEP WORK AREA CLEAR.** Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

Safety Symbols

This icon is displayed with any safety alert that indicates a personal injury hazard.

⚠ WARNING

This safety alert indicates a potentially hazardous situation that, if not avoided, **could** result in **death or serious injury**.

⚠ CAUTION

This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **minor or moderate injury**.

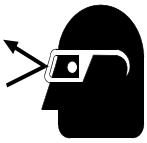
NOTICE

This alert indicates a situation that, if not avoided, **will** result in **damage to the equipment**.

IMPORTANT

This alert indicates a situation that, if not avoided, **may** result in **damage to the equipment**.

Protective Equipment Requirements



WARNING

Always wear impact resistant eye protection while operating or working near this equipment.

For additional information on eye and face protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

CAUTION

Personal hearing protection is recommended when operating or working near this equipment.

Hearing protectors are required in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises, and resonant structures can increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure and ANSI S12.6 Hearing Protectors.

Safety Procedures

All safety requirements listed below are those generally applicable to hydraulically-powered machinery but are not intended to be an all-inclusive list. They are intended as guidelines only and will assist in avoiding risk of injury when followed by qualified, experienced personnel. These

precautions should be included in the comprehensive safety program for the particular machinery, equipment, plant or process and overseen by personnel capable of analyzing any hazards associated with operating and maintaining the equipment.

WARNING
Many types of machinery have parts that may start moving as soon as the hydraulic circuit is filled and pressurized. This could result in injury to personnel or damage to machinery.

1. Return all movable parts of the machinery being operated to their normal startup condition, if possible, before starting unit.
2. Be sure all personnel, product, etc. are clear of machinery before starting hydraulic unit.
3. Check to make sure any hydraulic connections which may have been removed, replaced or disconnected during shut down have been reconnected securely before starting hydraulic unit.
4. Before starting the unit, perform all equipment checks described at the beginning of the operating instructions.
5. If there are tools or machinery being operated by the HPU that may move when hydraulic flow or pressure are turned off or turned on, block or lock these parts in position before shutting down the hydraulic unit.

WARNING
Make sure all personnel are clear from the machinery being operated before shutting down the HPU.

6. Shut down the hydraulic unit and relieve pressure from all pressurized accumulators, actuators and lines before removing, tearing down or performing maintenance on any remotely-located actuators, hoses, filters, valves, piping, etc.
7. Any personnel observing or working on or adjacent to hydraulically-powered equipment must never place themselves in a location or position that could produce an injury in the event of:

- a hydraulic line failure either with the unit running or shut down;
- pump or motor failure or;
- pin-hole leaks in hoses or fittings;
- movement of machine components during normal operation or resulting from a component malfunction or failure.

8. Do not inspect hoses and fittings for leaks using your bare hands. A pin-hole leak can inject hydraulic fluid through the skin, with the potential for serious injury.

9. Avoid locating equipment in any environment for which it was not designed and which may create a dangerous operating condition such as an explosive atmosphere (e.g., gas, dust), high heat (e.g., molten metal, furnace), chemicals, extreme moisture, etc.

10. Avoid bodily contact with hydraulic fluids. Some hydraulic fluids may irritate or injure the eyes and skin. Check with your fluid suppliers to obtain this information.

11. Use only E.H. Wachs parts and materials when servicing the equipment. Substitute parts or materials could produce a hazardous operating condition.

12. When piping your equipment, use only materials of adequate size and strength to suit the flows and pressures of the system. Consider all safety factors when selecting the strength of materials to allow for shock and over-pressure conditions which could occur.

WARNING
The injection of hydraulic fluid under the skin can cause serious injury and even result in death. If an injection injury occurs, seek medical treatment immediately.

Chapter 3

Operating Instructions

In This Chapter

HYDRAULIC SYSTEM

OPERATION

HYDRAULIC SYSTEM

The hydraulic system consists of a hydraulic fluid reservoir, filter assembly, single pump, and flow controls. The filter is a spin-on element for easy replacement. The filter housing has a pressure bypass valve to divert fluid directly to the tank in the event of a restricted filter.

Refer to the specifications table in Chapter 1 for capabilities of the hydraulic system and pump.

Pressure hoses from the pump are connected directly to a control module, which contains a relief valve, a flow control valve, and pressure and return ports. Optional control modules may contain additional valves and ports.

Hydraulic Fluid Requirements

The power unit is shipped from the factory empty. Oils meeting the specifications listed below will provide all-season operation if normal maintenance is performed.

The following fluids are recommended by E.H. Wachs. These fluids work well over a wide temperature range at start-up, allow moisture to settle out, and resist biological growth likely in cool operating hydraulic circuits. Other fluids that meet or exceed their specifications may also be used.

- Mobil DTE 24
- Mobil SCH 524
- Mobil DTE 10 Excel 32
- Shell Tellus T-32
- Texaco Rando

Table 1: Viscosity

Temperature	Viscosity
50° F (10° C)	450 SSU max. (95 centistrokes, C.S.)
100° F (38° C)	130-220 SSU (27-42 C.S.)
140° F (60° C)	85 SSU min. (16.5 C.S. min)

Table 2: Hydraulic Fluid Properties

Property	Specification
Pour point	-10° F (-23° C) min. (for cold startup)
Viscosity index	(ASTM D 2220) 140 min.
Demulsibility	(ASTM D 1401) 30 minutes max.
Flash point	(ASTM D 92) 340° F (171° C) min
Rust inhibition	(ASTM D 665 A&B) Pass
Oxidation	(ASTM D 943) 1000 hours min.
Pump wear test	(ASTM D 2882) 60 mg max.

Tool Hose Recommendations

The following table lists recommended hydraulic hoses for a variety of applications.

Table 3: Hydraulic Hose Recommendations

FLOW PER CIRCUIT		LENGTH EACH HOSE			INSIDE DIAMETER		SAE SPEC (WIRE BRAID)	SAE SPEC (FIBER BRAID)
GPM	LPM	FEET	METERS	USE	INCH	MM		
5 to 8	19 to 30	to 50	to 15	Both	1/2	13	SAE100R1-8	SAE100R7-8
5 to 8	19 to 30	51-100	15 to 30	Both	5/8	16	SAE100R2-10	SAEI00R8-10
5 to 8	19 to 30	100-300	30 to 90	Pressure Return	5/8 3/4	16 19	SAE100R2-10 SAE100R1-12	SAE100R7-12 SAE100R7-12
9 to12	34 to 45	to 50	to 15	Both	5/8	16	SAE100R2-10	SAE100R8-10
9 to12	34 to 45	51-100	15 to 30	Pressure Return	5/8 3/4	16 19	SAE100R2-10 SAE100R2-12	SAE100R8-10 SAE100R7-12
9 to12	34 to 45	100-200	30 to 60	Pressure Return	3/4 1	19 25.4	SAEI00R2-12 SAE100R1-16	SAE100R8-12 SAE100R7-16
13to16	49 to 60	to 25	to 8	Pressure Return	5/8 3/4	16 19	SAE100R2-10 SAE100R1-12	SAEI00R8-10 SAE100R7-12
13to16	49 to 60	26 to 100	8 to 30	Pressure Return	3/4 1	19 25.4	SAE100R2-12 SAE100R1-16	SAE100R8-12 SAE100R7-16

OPERATION

Pre-Operation Checklist

- Check the oil level in the hydraulic reservoir, and add oil if necessary.
- Connect the unit according the wiring instructions in Chapter 1.
- Check all hydraulic hoses for damage.
- Check all fittings and couplings to make sure they are tightly connected.
- Make sure the front of the motor is free of leaves, dirt, or other debris that may inhibit cooling or create a fire hazard.
- Check hydraulic connections as described in the following figure.
  1 = H.T.M.A. 3/8” male quick acting coupler with 1/2” NPT thread.
  2 = H.T.M.A. 3/8” female quick acting coupler with 1/2” NPT thread. (At the tool this may be H.T.M.A. 3/8” female quick acting coupler with 3/8” NPT thread.
  3 = H.T.M.A. 3/8” quick acting coupler with 1/2” NPT

thread.
4 = H.T.M.A. 3/8” male quick acting coupler with 1/2” NPT thread. (At the tool this may be H.T.M.A. 3/8” male quick acting coupler with 3/8” NPT thread.
A = Refer to Table 3 for hose recommendations.
B = Use adapters with threads that match the tool connectors.

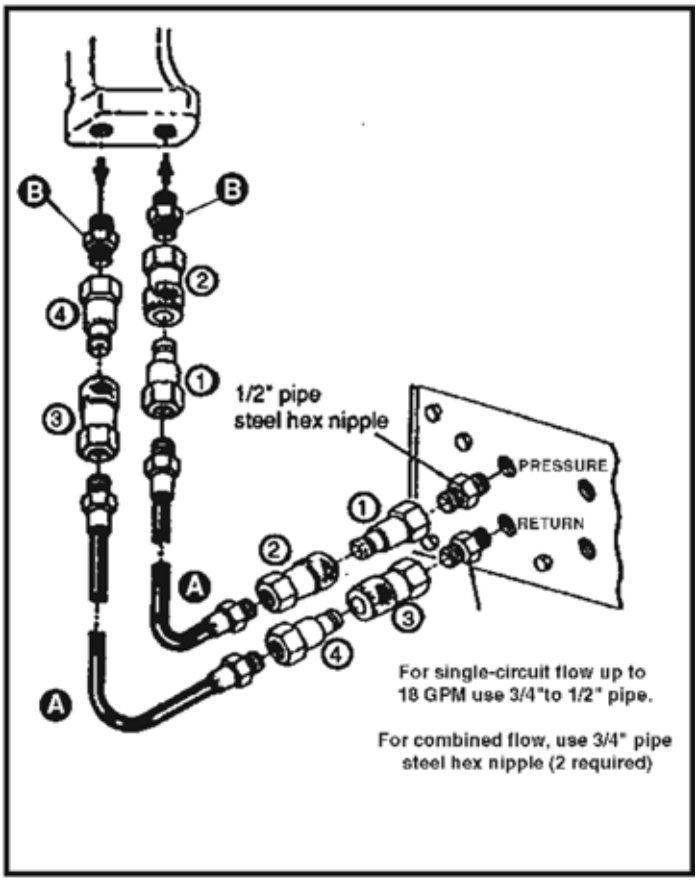


Figure 3-1. The diagram illustrates the hydraulic connectors.

Starting the Power Unit

1. Make sure the flow control circuit is set at 0 or off.
2. Make sure the tool is off or deactivated.
3. Connect the hydraulic hoses to the couplers on the power unit.
4. Connect the hydraulic hoses to the couplers on the tool.

5. Plug the power unit into the power source.
6. Turn the motor switch ON.
7. Allow the power unit to run without activating the tool until the hydraulic circuit warms up.

Operating the Tool

1. With the power unit running, turn the hydraulic circuit to the ON position, or turn the flow setting control to enable flow.
2. To pause or shut off the tool, return the circuit control to the OFF position, or set the flow control to 0.
3. When finished, turn the power unit switch to the OFF position.

Chapter 4
Maintenance

IMPORTANT: Use on genuine E.H. Wachs parts or equivalent. Using replacement parts that are not of equivalent quality may damage the hydraulic power unit.

In This Chapter

HYDRAULIC SYSTEM MAINTENANCE

MOTOR MAINTENANCE

TROUBLESHOOTING

HYDRAULIC SYSTEM MAINTENANCE

Observe the following for maximum performance and service life from the hydraulic system. See Table 1 at the end of this section for maintenance intervals.

- Use the correct hydraulic fluid at all times.
- Keep the hydraulic system and fluids clean at all times.
- Keep water out of the fluid.
- Keep air out of the lines. Air is indicated by the hydraulic system overheating and foam at the hydraulic tank breather. Tighten all suction line fittings and clamps.
- Hydraulic system wear is indicated by increased heat during tool operation, reduced tool performance, and eventual system breakdown.

1. Remove condensed moisture from the hydraulic fluid.

   - Condensation is a frequent problem with cool mobile hydraulic circuits. This condition occurs in moist or cold climates when warm air in the reservoir tank draws moisture from the cooler outside air. Water will then accumulate in the tank.
   - Check the suction hose from the hydraulic tank to the pump inlet to make sure it is not kinked and that

the clamps are secure. This will reduce the risk of pump cavitation and sucking air into the system. All pump fittings must be tight.

- Approximately once each week (less often in hot, arid climates), take a small sample from the bottom of the hydraulic tank by removing the 1/2" NPT drain plug. If clear water appears, drain tank until clean oil is flowing. If fluid is milky, allow it to settle for about 48 hours before draining.

2. Check hydraulic fittings and lines. Check for leaks, loose fittings, etc. throughout the entire hydraulic circuit.

3. Change the hydraulic filter.

   - To keep contaminants out of the hydraulic fluid and extend filter life, always connect the hose ends together when the tool is disconnected, and wipe off the connectors each time before connecting them.

4. Fill the hydraulic tank.

   - Remove the filter cap at the top center of the tank to fill it. The tank is full when oil appears in the perforated basket at the bottom of the filler pipe.

Table 1: Hydraulic Maintenance Schedule

Service Item	Service Interval
Check fluid level	Each use or 8 hours
Check oil and filter	Every year or 300 hours
Remove condensation from fluid	Every 3 months or 50 hours
Inspect hydraulic system for leaks	Each use or 8 hours
Check pump coupling (replace if necessary)	Every 2 years*
Check internal hose assemblies (replace if necessary)	Every 2 years*
Test hydraulic flows and pressures (service as required)	Every 2 years*

* These items should be serviced by a qualified hydraulics technician.

MOTOR MAINTENANCE

The sealed motor bearings are pre-greased at the factory for normal bearing life.

1. On motors supplied with a grease fitting, apply grease with a grease gun according to the schedule in Table 2 at the end of this section.
   - On NEMA 215 and smaller frames, use 1 to 2 full strokes of the grease gun.
   - On NEMA 254 through NEMA 365 frames, use 2 to 3 strokes.
   - On NEMA 404 and larger frames, use 3 to 4 strokes.
2. On motors with drain plugs, remove the grease drain plug and run the motor for 20 minutes. Replace the drain plug.
3. On motors equipped with slotted head grease screws, remove the screw and apply grease tube to the hole.
   - On NEMA 215 and smaller frames, insert a 2 to 3 inch length grease string.
   - On NEMA 254 and larger frames, insert a 3 to 5 inch length grease string.

Table 2: Motor Maintenance Schedule

Usage Level	Relube Interval		
	42 to 215T Frame	254 to 326T Frame	364 to 447T Frame
5000 hours	5 years	3 years	1 year
Continuous normal application	2 years	1 year	9 months
Seasonal service (motor is idle for 6 months or more)	1 year (beginning of season)	1 year	1 year
Continuous in wet or dirty environment	6 months		

TROUBLESHOOTING

Table 3: Power Unit Troubleshooting

Problem	Cause	Remedy
Motor will not start	Line trouble (such as single phasing at the starter).	Check power source for overloads, fuses, controls, etc.
Excessive humming	High voltage.	Check input line connection.
Motor overheating	Overload. Compare actual amps (measured) with nameplate ratings.	Locate and remove source of excessive friction in motor or load.
		Reduce load or replace motor with one of greater capacity.
	Single phasing.	Check current at all phases (should be approximately equal) and correct problem when isolated.
	Improper ventilation.	Check external cooling fan to be sure air is moving properly.
		Check motor for dirt build-up and clean motor.
	Unbalanced voltage.	Check voltage at all phases (should be approximately equal) and correct problem when isolated.
	Rotor rubbing on stator.	Check air gap clearance and bearings.
		Tighten “through bolts”.
	Over voltage or under voltage.	Check input voltage at each phase to motor.
	Open stator winding.	Check stator resistance at all three phases for balance.
	Grounded wiring.	Perform dialectric test and repair as required.
	Improper connections.	Inspect all electric connections for proper termination, clearance, mechanical strength, and electrical continuity. Refer to motor lead connection diagram on motor plate.
Bearing overheating	Excessive grease in bearing.	Remove grease until cavity is approximately 3/4 filled.
	Insufficient grease in bearing.	Add grease until cavity is approximately 3/4 filled.
	Dirt in bearing.	Clean bearing cavity and bearings. Repack with correct grease until cavity is approximately 3/4 filled.

Table 3: Power Unit Troubleshooting

Problem	Cause	Remedy
Vibration	Rubbing between rotating parts and stationary parts.	Isolate and eliminate cause of rubbing.
	Rotor out of balance.	Have rotor balance checked or repaired.
	Resonance.	Tune system or contact E.H. Wachs service for assistance.
Noise	Foreign material in air gap or ventilation openings.	Remove rotor and foreign material. Reinstall rotor.
		Check insulation integrity.
		Clean ventilation openings.
Growling or whining	Bad bearings.	Replace bearings. Clean all grease from cavity and new bearing. repack with correct grease until cavity is approximately 3/4 filled.
Motor runs but hydraulic circuit will not drive tools	Tool not connected to power unit.	Connect tool. Check coupler.
	Hydraulic fluid reservoir low.	Check and fill as required.
	Tool hoses blocked.	Remove obstruction.
	Tool hoses incorrectly connected to circuit fittings.	Check that tool hose goes from top port and from tool return or out port to lower port; both ports on same side of the manifold.
	Relief valve(s) stuck open.	Adjust or replace valve(s).
	Tool is defective.	Repair as necessary.
Tool runs too hot	Hoses too small.	Increase hose diameter. (Refer to hose specification table in Chapter 3.)
	Improper fluid.	Replace fluid.
	Cooler clogged, blocked air flow.	Clean cooler and straighten fins as necessary.
	Hydraulic pump damaged.	Replace pump.
	Flow control valves or priority valves have been added to circuit.	Some rotary tools must have flow controls. Adjust flow to match tool gpm to avoid forcing excess flow over relief.
	Closed center tools in use.	Use only open center tools.

Chapter 5

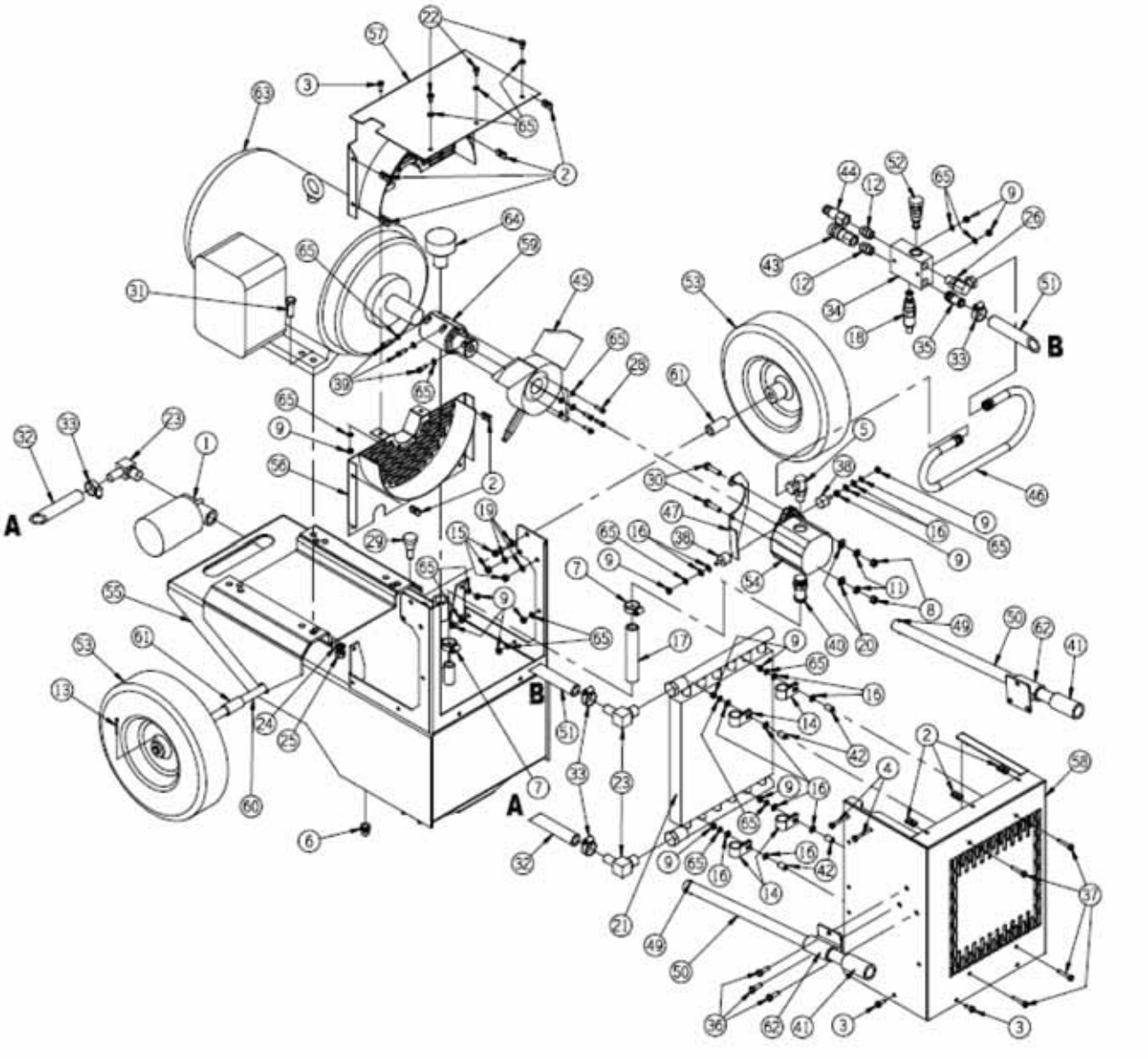
Parts List and Assembly

The following table lists the parts for the HCM-3E4-50 power unit. See the drawing after the list for assembly and parts identification.

ITEM	DESCRIPTION	QTY
1	FILTER COMPLETE FILTER ELEMENT REPLACEMENT	1
2	NUT JAM,	9
3	BOLT, 1/4nc X 3/4	19
4	BOLT, 1/4nc X 2 ¼	2
5	FITTING, #6901-10-8	1
6	PLUG, 1/2 MAGNETIC	1
7	CLAMP HOSE	2
8	NUT, 3/8 nc	2
9	NUT ¼ nc	23
10	NUT ¼ nc NYLOCK	2
11	LOCK WASHER 3/8	2
12	FITTING, 1/2 NIPPLE #5404-0808	2
13	PIN, COTTER 1/8 X 1 1/4	2
14	CLAMP, .750	4

15	NUT, 5/16nc	6
16	WASHER, 1/4 FLAT PLATED	12
17	HOSE, -16 X 5.5	1
18	VALVE, RELIEF	1
19	WASHER, LOCK 5/16	6
20	WASHER FLAT 5/16	2
21	COOLER	1
22	BOLT, 1/4nc X ½	4
23	FITTING #4501-1212	3
24	WASHER, LOCK 1/2	4
25	NUT, 1/2 nc	4
26	FITTING #2047-8-8S	1
27	WASHER, LOCK 10-32 BOLT	4
28	BOLT 1/4nc X 3/4 SOCKET HEAD	4
29	GAUGE, SIGHT	1
30	BOLT 3/8nc X 1 ¼	2
31	BOLT 1/2nc X 2	4
32	HOSE, RETURN -12 X 40	1
33	CLAMP, HOSE	5
34	MANIFOLD	1
35	FITTING #20350-12-8	1
36	BOLT 5/16nc X 3/4	6
37	BOLT 1/4ncX 1 ½	4
38	FOOT	2
39	BOLT 1/4ncX1 SK.HD. CAP.SCREW	3
40	FITTING 4604-16-12	1
41	GRIP HANDLE	2
42	SPACER COOLER	4
43	COUPLER HYDRAULIC FEMALE	1
44	COUPLER HYDRAULIC MALE	1
45	FAN	1
46	HOSE PRESSURE	1

47	SUPPORT PUMP	1
48	GRAPHIC SET E-10 PortaCo	1
49	PIN SPRING	2
50	HANDLE	2
51	HOSE RETURN	1
52	VALVE CONTROL	1
53	WHEEL 14"	2
54	PUMP HYDRAULIC	1
55	TANK/FRAME	1
56	GUARD FAN LOWER	1
57	GUARD FAN UPPER	1
58	GRILL	1
59	COUPLER PUMP	1
60	AXLE	1
61	SPACER WHEEL	2
62	MOUNT HANDLE	2
63	MOTOR ELECTRIC 15 HP	1
64	CAP FILLER	1
65	WASHER LOCK 1/4	38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Chapter 6
Ordering Information

In This Chapter

ORDERING REPLACEMENT PARTS

REPAIR INFORMATION

WARRANTY INFORMATION

RETURN GOODS ADDRESS

To place an order, request service, or get more detailed information on any E.H. Wachs products, call us at one of the following numbers:

U.S.	800-323-8185
International:	847-537-8800

You can also visit our Web site at:

www.ehwachs.com

ORDERING REPLACEMENT PARTS

When ordering parts, refer to the drawings and parts lists in Chapter 8. Please provide the part description and part number for all parts you are ordering.

REPAIR INFORMATION

Please call us for an authorization number before returning any equipment for repair or factory service. We will advise you of shipping and handling. When you send the equipment, please include the following information:

- Your name/company name
- Your address
- Your phone number
- A description of the problem or the work to be done.

Before we perform any repair, we will estimate the work and inform you of the cost and the time to complete it.

WARRANTY INFORMATION

Enclosed with the manual is a warranty card. Please fill out the registration card and return to E.H. Wachs. Retain the owner's registration record and warranty card for your information.

RETURN GOODS ADDRESS

Return equipment for repair to the following address.

E.H. Wachs
600 Knightsbridge Parkway
Lincolnshire, Illinois 60069 USA

600 Knightsbridge Parkway • Lincolnshire, IL 60069
847-537-8800 • www.ehwachs.com